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(12) UK Patent Application (19) GB (11) 2 248 816 A (13)

(43) Date of A publication 22.04.1992

(21) Application No 9112640.9

(22) Date of filing 12.06.1991

(30) Priority data

(31) 9014044

(32) 23.06.1990

(33) GB

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(51) INT CL<sup>5</sup>

B65G 13/06

(52) UK CL (Edition K)

B8A A4JB

F1F FAX F1A4B

U1S S1876

(56) Documents cited

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(58) Field of search

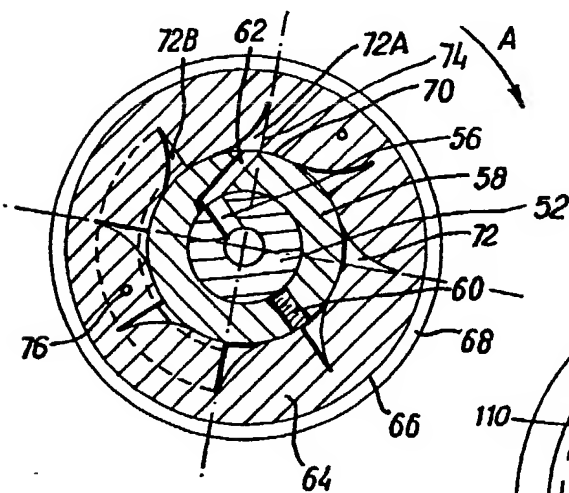
UK CL (Edition K) B8A A4JB, F1F FAX, F1T TA

INT CL<sup>5</sup> B65G, F01C, F01D

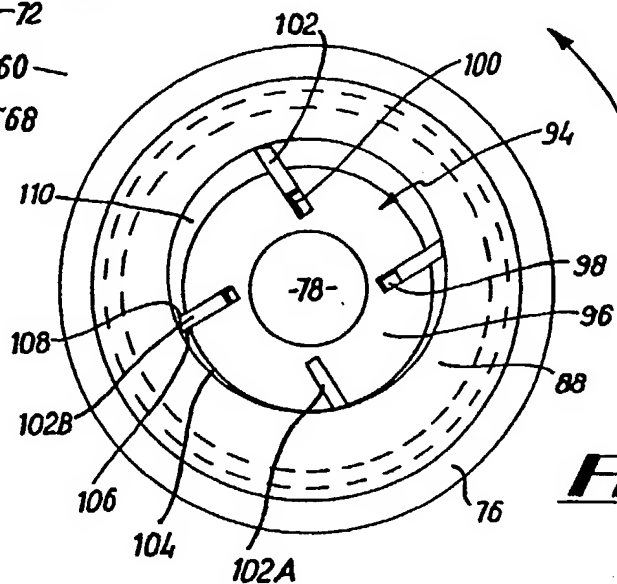
Online databases: WPI

(54) Pneumatically driven roller conveyor

(57) Pneumatically driven rollers of a roller conveyor comprise a hollow spindle through which compressed air flows to an impeller unit within the roller and comprises apertures 72 in Fig. 6 and blades 102 in Fig. 9.



**Fig. 6**



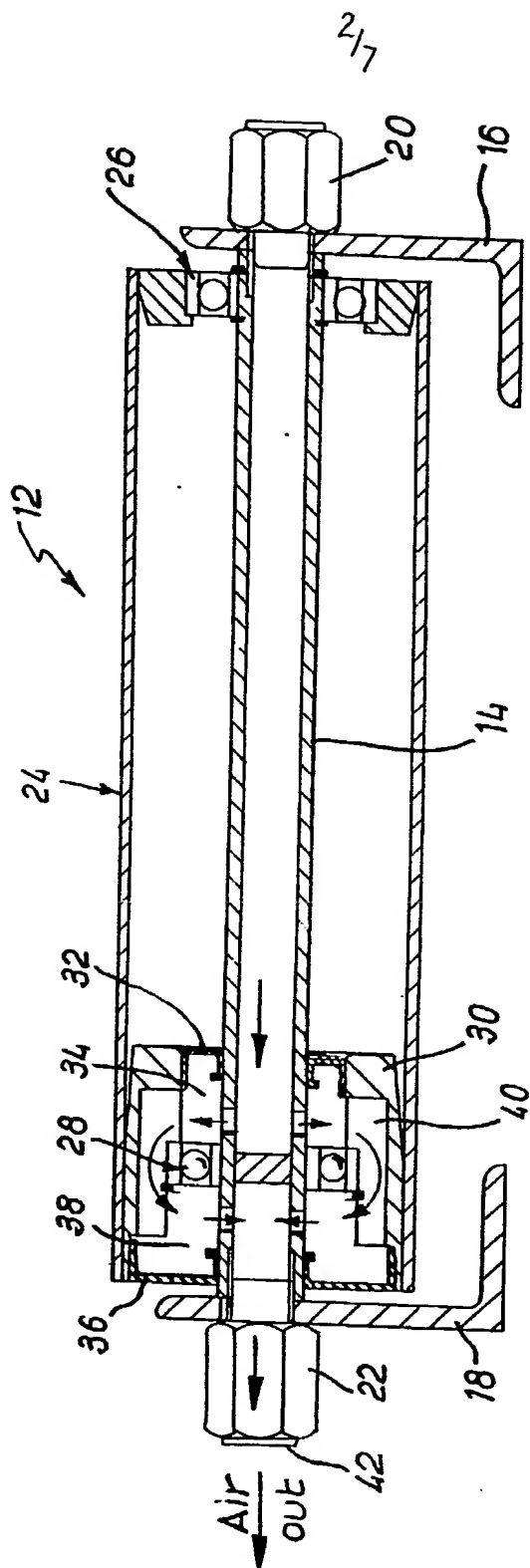
**Fig. 9**

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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# FILE



**Fig. 2**

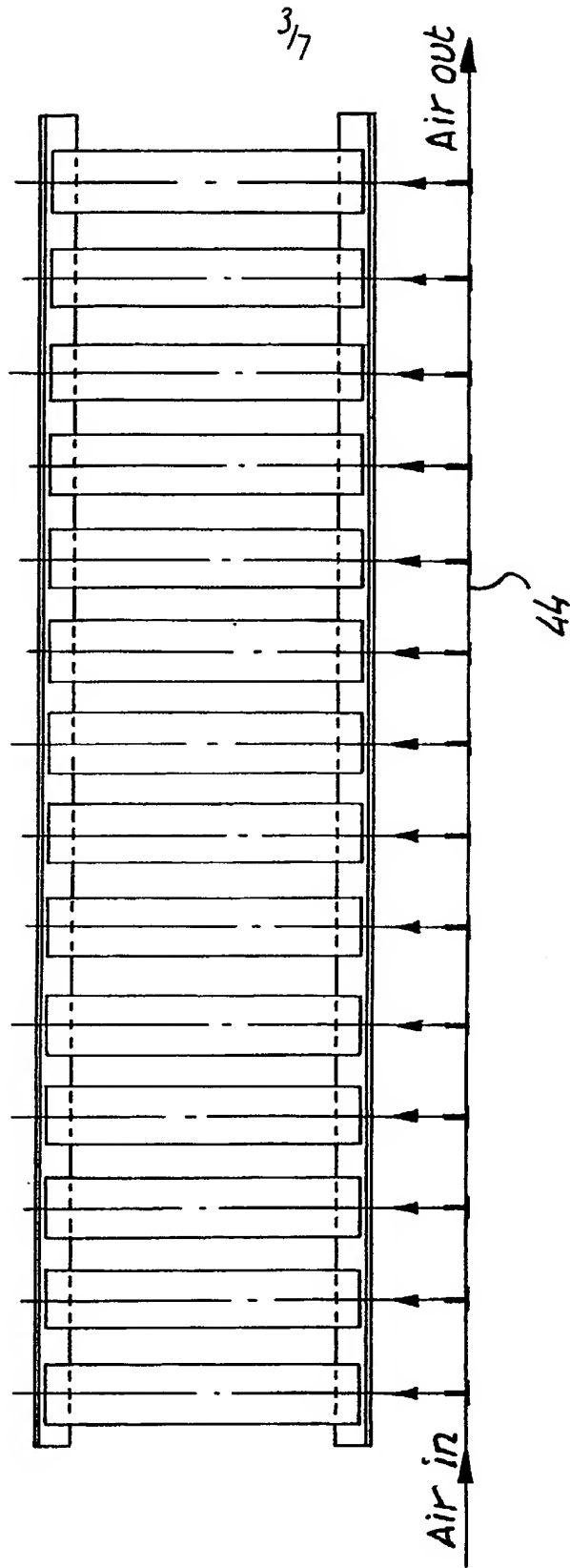
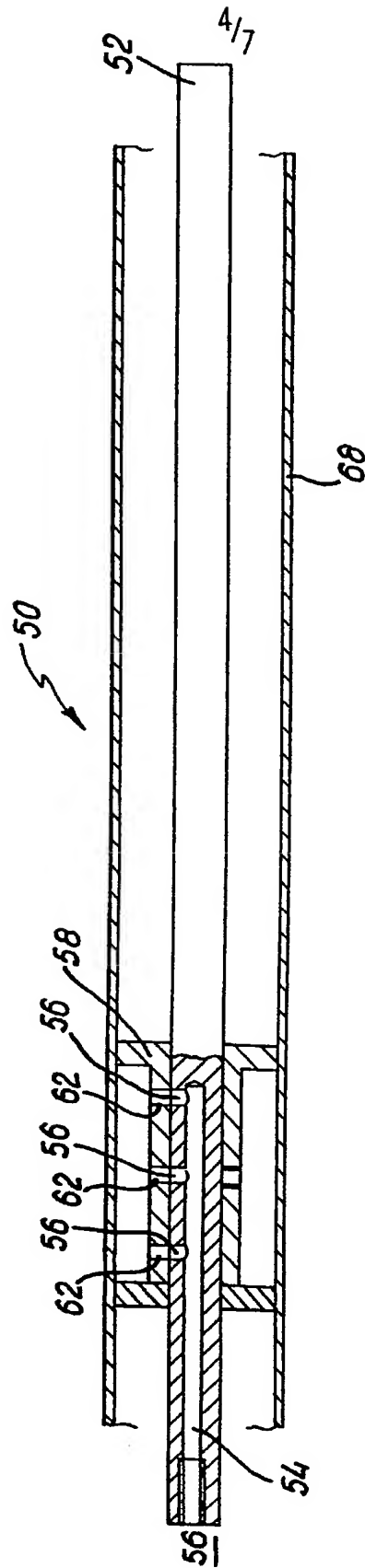
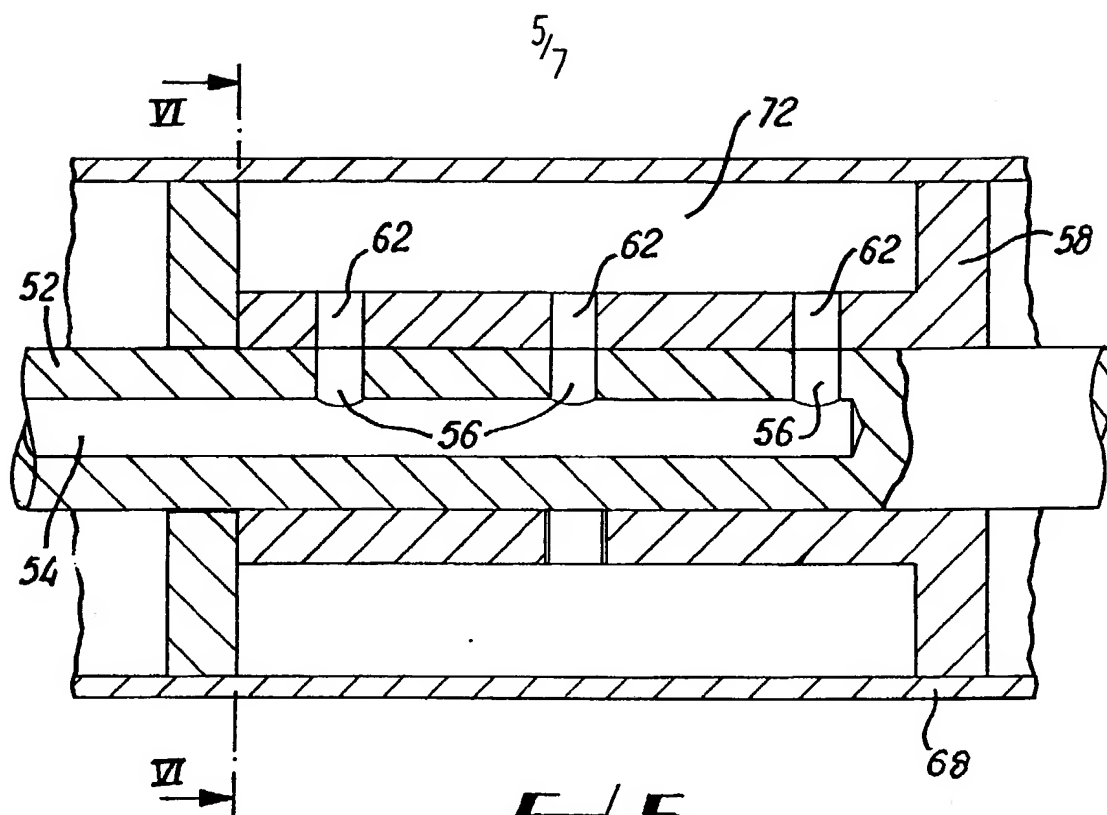


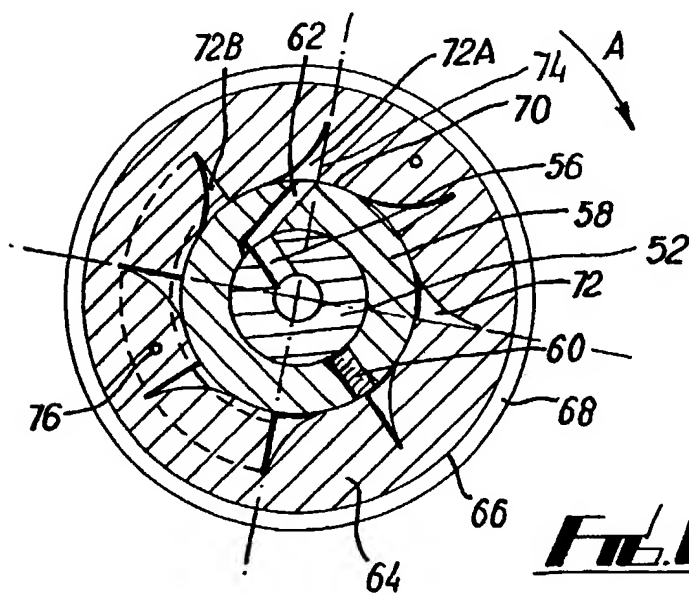
Fig. 3



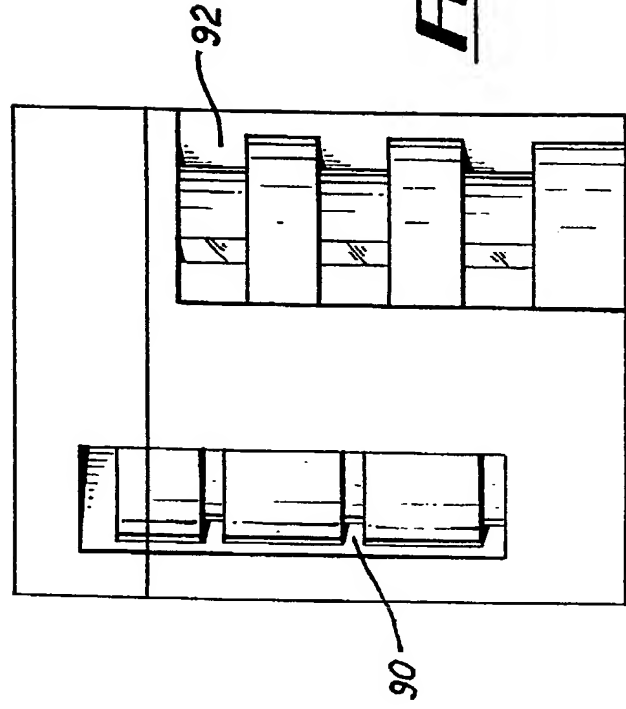
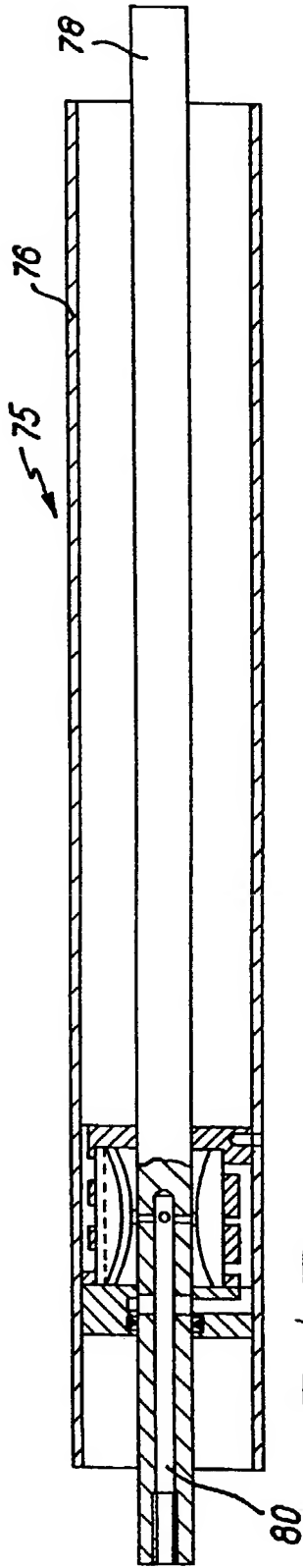
**FIG. 4**

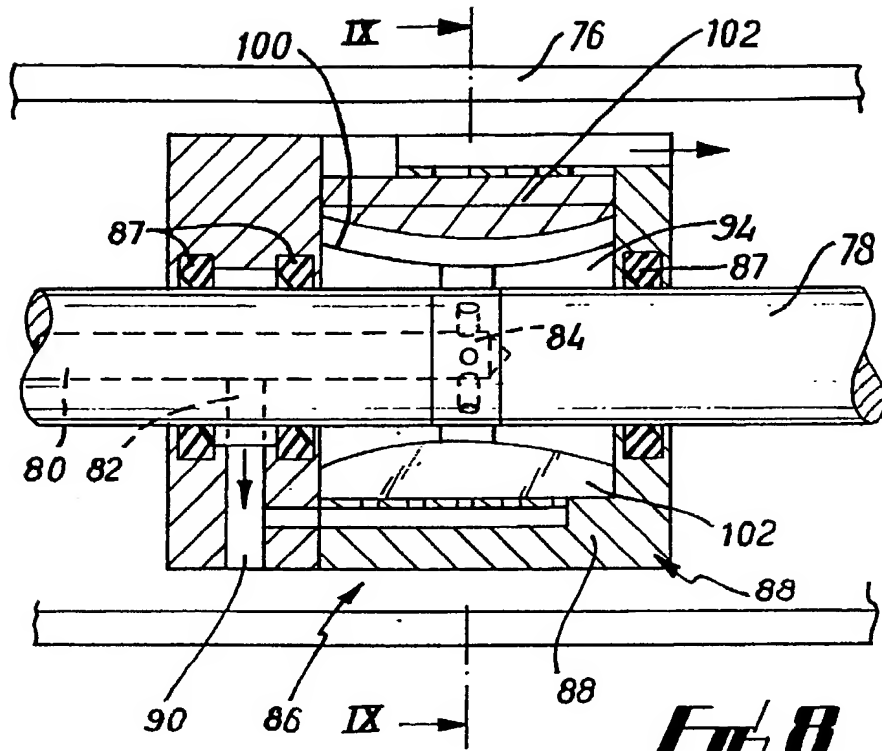


**FIG. 5**

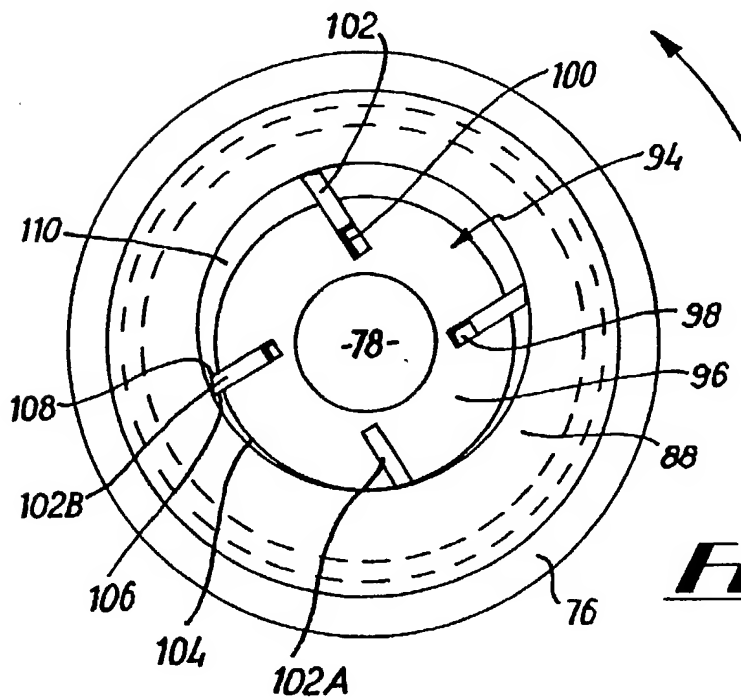


**FIG. 6**





**FIG. 8**



**FIG. 9**

- 1 -

A CONVEYOR

This invention relates to conveyors.

Known powered conveyors require an electric motor, chain drive and in some applications a belt.

These known conveyors are expensive to manufacture and comprise a number of parts which are prone to wear and are thus often in need of replacement.

The present invention has been made from a consideration of these problems.

According to the present invention there is provided a conveyor comprising a plurality of rollers, wherein at least one of said rollers is driven by compressible fluid.

In a preferred embodiment of the invention at least one and preferably all of the rollers are pneumatically driven. The rollers may comprise a hollow roller spindle which is mounted on a support. A cylindrical casing is preferably rotatably mounted around the spindle. The outer casing may be driven by the flow of the compressible fluid from the spindle through an impeller unit mounted on the interior of

the cylindrical casing and rotatable relative to the spindle. The compressible fluid may flow from the outlet of the impeller unit into the spindle of a second preferably adjacent roller. Alternatively the compressible fluid may be directed to more than one roller via a common line. The compressible fluid may comprise air.

Preferably compressed fluid is directed through a means for rotating the roller, which may be located inside the roller. The means for rotating the roller may comprise means for directing compressible fluid into a confined space located in a rotatable part of the roller.

The means for rotating the roller may comprise means for creating a pressure difference inside the roller so as to rotate an outer part of the roller. This may comprise a body mounted eccentrically within the roller. Sealing means may be provided on said body for sealingly engaging the outer body. This sealing means may comprise vanes located in slots in said body.

In order that the invention may be more readily understood a specific embodiment thereof will now be described by way of example only with reference to the accompanying drawings in which:-

Fig. 1 is a plan view of a conveyor in accordance with the present invention;

Fig. 2 is a cross section of a roller of the conveyor of Fig. 1;

Fig. 3 is a plan view of a second conveyor in accordance with the present invention;

Fig. 4 is a longitudinal cross section through a further roller of a further conveyor in accordance with the present invention;

Fig. 5 is a magnified view of part of the roller of Fig. 4;

Fig. 6 is a cross section through the line VI-VI of Fig. 5;

Fig. 7 is a longitudinal cross section through a roller of a further conveyor in accordance with the present invention;

Fig. 8 is a magnified view of part of the roller of Fig. 7;

Fig. 9 is a cross section through the line IX-IX of Fig. 8; and

Fig. 10 is a perspective view of the part of the roller shown in Fig. 8.

Referring to Figs. 1 and 2 a conveyor 10 comprises a plurality of aligned rollers 12. Each roller 12 comprises a hollow spindle 14 which is secured to the arms 16,18 of a frame by nuts 20,22. A cylindrical roller tube 24 is rotatably mounted on the spindle 14 via bearings 26,28. An annular casing 30 is affixed to the interior of the roller tube 24. A sliding seal 32 defines the side wall of a first annular chamber and a second sliding seal 36 defines a side wall of a second annular chamber 38. An impeller unit 40 is provided between the two chambers 34,38.

In use air is urged through the spindle 14, through the first annular chamber 34, impeller unit 40 and second annular chamber 38 and out through the exit 42. The air subsequently travels into the spindle of the adjacent roller 12 and subsequently to the impeller unit of that adjacent roller as shown in Fig.1.

One air input therefore drives the impeller units of each of the rollers 12.

Alternatively referring to Fig.3 there is shown a second conveyor in which a compressible fluid such as

air is fed to each of the rollers from a common air line 44. This arrangement is particularly suitable for operating large rollers.

Referring to Figs. 4 to 6 a roller 50 is rotatable about a central longitudinal axis defined by a fixed shaft 52. Bearings (not shown) are provided at the ends of the roller. A bore 54 extends from one end 56 of the shaft 52 along the central axis of the shaft 52. The bore 54 is open to the exterior of the shaft via three channels 56 which extend perpendicular to the bore 54.

A cylindrical shaft surround 58 is secured to the shaft 52 via a grub screw 60. The surround 58 contains three passageways 62 which have openings in register with the channels 56. The passageways 62 are set at an angle to the channels 56 as can best be seen in Fig. 6.

A star moulding 64 is fixed at its outer face to the inside 66 of the roller casing 68. The star moulding 64 comprises a substantially circular wall 70 which sealingly engages the outer surface of the surround 58. The star moulding 64 is mounted such that it may rotate relative to the shaft 52 and the surround 58. A plurality of triangular apertures 72 extend from the circular wall 70 into the star moulding 64. It can be seen that one wall of the triangular apertures 72

extends parallel with the channels 56 in the surround 58.

In use compressed air is directed into the bore 54 and passes out through the channels 56. The compressed air is then directed via the passageways 62 in the surround 58 onto the axially directed face 74 of a first triangular aperture 72A. The compressed air strikes the axial face 74 and a pressure build up on that face 74 in the triangular aperture 72 causes the star moulding 64 and roller casing 68 to rotate in a clockwise direction "A". The action of the compressed air on the first triangular aperture 72A causes the star moulding 64 to rotate until a second triangular aperture 72B is adjacent the passageway 62. Rotation of the star moulding 64 and thus roller casing 68 continues in this manner with exhaust gases passing out through the exhaust part 76.

Referring to Figs. 7 to 10 there is shown a roller 75 of a further conveyor in accordance with the present invention. The roller 75 comprises a hollow roller casing 76 with bearings (not shown) at either end. The roller 75 rotates about an axis defined by a central shaft 78. A blind bore 80 extends part way along the shaft 78. A first channel 82 extends from the bore 80 via passageway 90 to the exterior of the outer member 88. A second set of channels 84 also extends from the

bore to the exterior of the shaft 78. The second set of channels 84 comprise four channels which are set at ninety degrees to each other.

The shaft 78 extends through a cylindrical body 86 for rotating the roller 75 and is engaged by seals 87 provided in the body. The body 86 comprises an outer member 88 which is fixed to the inside of the roller casing 76 and an inner member 94. The outer member 88 is mounted on the shaft 78 by the seals so as to allow relative rotation between the shaft 78 and the outer member 88. The outer member 88 comprises a passageway 90 which has an opening in register with the first channel 82 provided on the shaft 78.

An exhaust part 92 is provided on the opposite side of the outer member 88.

The inner member 94 comprises a cylindrical shaft surround 96 which is fixed to the shaft 78. Four slots 98 having arcuate inner faces 100 are equally spaced around the surround 96. A vane 102 is provided in each slot 98, the vanes 102 being the same shape as the slots 98 and being a snug fit inside the slots 98. Each slot 98 communicates with the bore 80 through the shaft 78 via the channels 84.

It can be seen from Fig. 9 that the inner member

94 is eccentrically mounted in the outer member 88.

In use compressed air is passed down the blind bore 80 and the first and second channels 82,84. Air passing through the second set of channels 84 urges the vanes 102 to move out of their respective slots 98 so as to engage the inside of the outer member 88. However, the main compressed air flow is through the first channel 82 into a chamber 104 inbetween the inner and outer members 94,88 and closed between two vanes 102A, 102B. Air arriving in this first chamber 104 exerts no force on the first vane 102A since that vane 102A is wholly within its slot as the inner and outer members 94,88 are in contact at that point. The compressed air therefore exerts a high pressure on the inner face 106 of the second vane 102B. There is no pressure on the other face 108 of that vane 102B and this causes the outer member 88 and the roller casing 76 to rotate anti-clockwise in direction "B". As the roller casing 76 rotates air passes into the next chamber 110 and the process repeats itself so as to produce continuous rotation. Air is exhausted through the exhaust part 92 as the exhaust part 92 passes the air filled chamber.

The conveyor of the present invention offers a number of advantages when compared to known conveyors. The number of fast wearing parts such as motors, chains

and belts is minimized. With the conveyor of the invention the minimum height of the conveyor is the diameter of the rollers thus leading to space saving and reduced transportation costs. The conveyor of the present invention is particularly cost effective to produce.

It is to be understood that the above described embodiment is by way of illustration only. Many modifications and variations are possible.

The speed of the rollers may be varied by adjusting the air pressure. The products being conveyed may also be spaced apart in this manner. Solenoid valves may be used in order to provide an accumulating conveyor. Any compressible fluid may be used.

CLAIMS

1. A conveyor comprising a plurality of rollers, wherein at least one of said rollers is driven by compressible fluid.
2. A conveyor as claimed in claim 1, wherein at least one of the rollers is pneumatically driven.
3. A conveyor as claimed in claim 1 or claim 2, wherein all of the rollers are pneumatically driven.
4. A conveyor as claimed in any preceding claim, wherein the rollers comprise a hollow roller spindle.
5. A conveyor as claimed in claim 4, wherein the compressed fluid is directed through the spindle.
6. A conveyor as claimed in any preceding claim, wherein compressed fluid is directed through a means for rotating the roller.
7. A conveyor as claimed in claim 6, wherein the means for rotating the roller is located inside the roller.
8. A conveyor as claimed in claim 6 or claim 7, wherein the means for rotating the roller comprises

means for directing the compressible fluid into a confined space located in a rotatable part of the roller.

9. A conveyor as claimed in claim 6 or claim 7, wherein the means for rotating the roller comprises means for creating a pressure difference inside the roller so as to rotate an outer part of the roller.

10. A conveyor as claimed in claim 9, wherein the means for creating a pressure difference comprises a body mounted eccentrically within the roller.

11. A conveyor as claimed in claim 10, wherein sealing means are provided on said body for sealingly engaging the outer body.

12. A conveyor as claimed in claim 11, wherein the sealing means comprise vanes located in slots in said body.

13. A conveyor as substantially hereinbefore defined with reference to Figs 1 and 2; 3; 4 to 6 and 7 to 10.

Patents Act 1977

Examiner's report to the Comptroller under  
Section 17 (The Search Report)

Application number

9112640.

Relevant Technical fields

(i) UK Cl (Edition K ) B8A (A4JB) F1F (FAX) F1T (TA)

(ii) Int Cl (Edition 5 ) B65G F01C F01D

Search Examiner

D C CROUCH

Databases (see over)

(i) UK Patent Office

Date of Search

19 JULY 1991

(ii)

Online Database: WPI

Documents considered relevant following a search in respect of claims

1-13

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	WO A1 85/01010 (HUTSON)	1-3, 6
X	FR A 2430899 (DUMONT) see the figures and Derwent Abstract WPI Acc. No 80/D7362C/17	1
X	DE A 3940184 (GEKE) see the figures and Derwent Abstract WPI Acc No 90-180030/24	1-9
X	DE A 3622875 (VOEST) see the figures and Derwent Abstract WPI Acc No N87-055127	1, 2, 4&6

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Category	Identity of document and relevant passages	Relevant to claim(s)

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